

TEACHING GREENHOUSE - MASTER TESTING LIST - UPDATED 11 MARCH 2022				
Type of Test	Status	Req #	Requirement	Remarks
Inspect		1.1.1	The north house shall be equipped with at least two temperature and humidity sensor modules.	
Inspect		1.1.2	The south house shall be equipped with at least eight temperature and humidity sensor modules.	
UTM		1.1.3	Temperature sensors shall be accurate to +/- 2°F or better.	
UTM		1.1.4	Humidity sensors shall be accurate to +/- 5% or better.	
UTS		1.1.5	All sensors shall operate properly in temperatures from 40 to 120 °F.	
UTS		1.1.6	All sensors shall operate properly from 0 to 100% humidity.	
Inspect		1.2.1	The greenhouse shall have at least 3 mobile sensors that are available to monitor the moisture content of the soil in any container.	
UTM		1.2.2	Soil moisture content readings shall be accurate to +/- 5% or better.	
UTS		1.2.3	Soil moisture sensors shall comply with the operating conditions specified for temperature and humidity sensors.	
UTS	*	2.1.1	Temperature and humidity data shall be retrieved from sensors and stored at intervals of 15 minutes or less.	
UTS		2.1.2	Environmental logs shall include, at a minimum, the temperature and humidity reported by each sensor and the time and date of the reading.	
Inspect		2.1.3	The system shall have adequate storage to retain logged data for at least two years.	
Integrate	*	3.1.1	A web interface shall numerically show temperatures and humidities from the latest reading.	
UTS		3.1.2	The web interface shall be accessible from off campus without use of the VPN.	
Inspect		3.2.1	The web interface shall be able to show graphs of recent temperature and humidity data, either individually per sensor, or using an average for each section of the greenhouse.	
UTS		3.2.2	<del>The time range of the graphs shall be user-selectable (allow the user to view data from the last 24 hours, 7 days, month, etc).</del>	Client prefers all such graphs shown simultaneously.
UTS		3.2.3	The system shall provide a method for users to retrieve a CSV file containing all logged data, without requiring user knowledge of linux tools such as scp or sftp.	
UTS & Integrate	*	4.1.1	A smartphone alert will notify Tina Ayers or other greenhouse personnel when user-defined safe temperature or humidity ranges are exceeded.	
UTS		4.1.2	A method shall be provided for users to add/remove alert recipients.	
UTS		4.1.3	A method shall be provided to adjust temperature setpoints and any control conditions.	
(not testable)		4.1.4	The alert will be in a concise, numerical listing of data.	Ambiguous
UTS		4.1.5	The system will notify all alert recipients within 5 minutes of an unsafe condition being detected.	
UTS		4.2.1	All alert recipients will be notified within five minutes of a sensor failure being detected.	
Inspect		4.2.2	At least two extra sensor modules will be left behind to allow for user replacement of failed modules.	
Inspect		4.2.3	Documentation will be provided so that new modules can be constructed if necessary.	
Inspect		5.1.1	At least two mixing fans shall be installed in the south house.	
Inspect		5.1.2	Mixing fans shall be rated for wet locations.	
Inspect		5.1.3	Mixing house fans shall not be battery-powered.	
UTS		5.1.4	The system shall be able to turn the fans on and off. At minimum, the following control modes will be provided:	
UTS		5.1.4.1	Always on	
UTS		5.1.4.2	Always off	
UTS		5.1.4.3	On during user-specified hours	
UTS & Integrate		5.1.4.4	On when excessive temperature differentials are detected within the greenhouse.	
Integrate		5.2.1.1	<del>The system shall control the south house glycol heater to maintain a user-selected temperature in the south house.</del>	Client no longer needs this functionality.
Inspect		5.2.1.2	<del>The temperature selection method shall be calibrated in degrees Fahrenheit.</del>	
Integrate		5.2.2.1	<del>The system shall control the wet wall and south house exhaust fan to maintain a user-selected temperature in the south house.</del>	
Inspect		5.2.2.2	<del>The temperature selection method shall be calibrated in degrees Fahrenheit.</del>	
Inspect		6.1.1	Equipment left in the greenhouse at the conclusion of the project shall not use solderless breadboards or other temporary circuit construction techniques.	
Inspect		6.2.1	All equipment shall adhere to relevant safety standards.	
Inspect		6.2.2	Equipment operating above 12V shall comply with the National Electrical Code.	We are not qualified to test this.